

NON-PUBLIC?: N
ACCESSION #: 8806070261
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Zion, Unit 1 PAGE: 1 of 4

DOCKET NUMBER: 05000295

TITLE: Reactor Trip due to Steam Generator Level transient after Feedwater
Pump Test

EVENT DATE: 02/24/88 LER #: 88-005-00 REPORT DATE: 03/25/88

OPERATING MODE: 1 POWER LEVEL: 049

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: William Stone, Regulatory Assurance Supv.

TELEPHONE #: 312-746-2084 Ext. 246

COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: SJ COMPONENT: FC MANUFACTURER: F130

REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: At approximately 1000 hours on February 24, 1988, Zion Unit 1 tripped from 49% power. The technical staff had been performing low pressure steam poppet testing on 1B Feedwater (FW) pump per Tech Staff Special Procedure (TSSP) 87-29. The immediate cause of the trip was high steam generator level caused by slow response of the 1C Feed Regulating Valve and its inability to follow the swing in FW header pressure when 1B FW pump was tripped off as part of the poppet test. Contributing factors were failure of TSSP 87-29 to anticipate the magnitude of the effect of FW pump speed on FW flow to the steam generators, false alarms on the annunciator panel due to a short circuit which diverted the operator's attention from the rising S/G level, and failure of the chart recorder for control room S/G level during the event. The reactor protection system functioned properly in tripping the unit, minimizing safety significance. Corrective actions include repairs to the FW regulating valve and revisions to FW pump poppet testing procedures.

(End of Abstract)

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Energy Industry Identification System (EIIS) codes are identified in the text as (xx)

A. PLANT CONDITIONS PRIOR TO EVENT:

MODE 1 - Power Ops. RX Power 49%

B. DESCRIPTION OF EVENT:

At approximately 0930 on February 24, 1988, the technical staff received authorization from the licensed shift supervisor to begin special test TSSP 87-29, "1B Feedwater (FW), (SJ) Pump Low Pressure Steam Poppet Test", Revision 0, dated 4/30/87. Prior to the start of the test the Unit had been reduced in power to 49%. The test, which had been previously performed, called for local control of the pump. Communication with the control room operator as well as all other test procedure prerequisites had been established. At 09:43 AM the first test was completed. At 09:53 AM the second test had begun. During the period from 9:44 to 9:52, the steam generator (SG) level indicators located in the control room had recorded a feedwater level swing of 46 to 57% level in the 1C Steam Generator. It was also noted the control valves had correctly responded to the transient. The second test was completed at approximately 10:05 and the 1B FW Pump was tripped off per the test procedure. During the next seven minutes Steam Generator levels decreased and then increased with three of the four FW regulating valves responding correctly. The C feedwater regulating valve (1LCV-FW-520) did not respond quickly enough to the rapid level increase and 1C Steam Generator level reached the high-high setpoint of 70%. In response to the High-High S/G level, the Main Turbine tripped off and caused the subsequent Unit 1 Reactor Trip at 10:12 a.m.

All the plant safety systems performed as designed during the unit trip and subsequent stabilization activities.

C. CAUSE OF EVENT:

The primary cause of the event is attributed to the slow response time of the C Feedwater regulating valve.

Prior to and during the feedwater test several plant evolutions were occurring that would have a significant effect on the outcome of the FW Test. One of these factors was the failure of the test procedure to anticipate the magnitude of the effect of FW pump speed on feedwater flow

to the steam generators.

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C. CAUSE OF EVENT: (Cont.)

On February 17, 1988 the Unit was ramped down for the addition of oil in the 1B RCP pump. At that time the operators discovered the sluggish response of 1LCV-FW-520, however, there were no log entries documenting this item nor did the shift turnover sheets indicate the concern. The operators on the Unit during the FW Test were unaware of the slow responding valve.

Immediately prior to the event, a short circuit in the wiring for control annunciator panel 10 caused eight alarms to come in solid for annunciators 1A, 1B, 1C and 1D, Steam Generator flow mismatch and annunciators 2A, 2B, 2C, and 2D Steam generator loop level deviation. Simultaneously the Aux FW pump low lube oil pressure low, radiation monitor channel on test and area radiation monitor failure alarms also came in. The annunciator panel failure did not contribute directly to the trip, none-the-less, the extra NSO assigned to the unit was diverted to validate the alarms.

At the time the first poppet test began, the pen recorder for steam generator level indication for the 1C Steam Generator failed to ink, causing the operator not to know how high the 1C Steam generator level was.

D. Analysis of Event:

The safety significance of the event was minimal. The Reactor Protection System (JC) functioned properly in tripping the unit.

E. CORRECTIVE ACTIONS:

The following corrective actions have been taken:

1. A post trip review of the event was taken with members of the operating, technical staff and substation construction departments on 3/5/88. Particular emphasis was placed on the need to record, by log entries or other appropriate means, plant response anomalies.
2. Identical timed response tests were performed on FW regulating valves 1LCV-FW-520 (C Loop) and 1LCV-FW-540 (B Loop) confirming the sluggishness of the C FW regulating valve. The valve is being repaired under work request number Z-67905. Technical Staff will

evaluate the results of this work request to determine if additional work is needed on the feedwater regulating valves.

3. The blown annunciator panel fuses were replaced and the annunciator panels were verified to be properly working under nuclear work request Z-67919.

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E. CORRECTIVE ACTIONS: (Cont.)

The following corrective actions remain to be taken:

1. Future poppet valve testing procedure will be enhanced. The poppet test procedure will be reviewed and changes made as necessary so that Steam Generator level is not significantly affected.
2. The station will evaluate possible modifications to include a Control Board alarm for Steam Generator high level, and provide inputs into the plant computer "sequence of events" program from Hi Hi S/G Level.
3. The review of the event will be included in the required reading package for all operators.
4. The station will consider replacement of the Steam Generator level recorders with a more reliable model.

F. PREVIOUS OCCURRENCES:

A previous reactor trip on steam generator level occurred on January 21, 1985 and is described in LER 295/1-85-05. Failure of a chart recorder used by the licensed operator to monitor coolant temperature during a planned transient was identified as a casual factor in that event.

G. COMPONENT FAILURE DATA:

MANUFACTURER NOMENCLATURE MODEL NUMBER MFG PART NUMBER

Fisher Control Pneumatic Type 2625
Volume
Booster

June 2, 1988

Document Control Desk

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Enclosed is a 1988 Licensee Event Report (LER) that I received but is not in the DCS system. The LER is for Zion, Unit 1, LER 88-005.

If you have any questions, please call me at 492-4497.

Sincerely,

/s/ Marcel R. Harper

Marcel R. Harper

Trends and Patterns Analyst

Trends and Patterns Analysis Branch

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